

(2) At any location on the side of the tank barge including on a transverse watertight bulkhead.

(c) *Type II barge hull.* If a Type II hull is required, design calculations must show that a barge can survive damage at any location except on a transverse watertight bulkhead.

#### § 172.105 Extent of damage.

For the purpose of § 172.103, design calculations must include both side and bottom damage, applied separately. Damage must consist of the most disabling penetration up to and including penetrations having the following dimensions:

(a) Side damage must be assumed to be as follows:

(1) Longitudinal extent—6 feet (183 centimeters).

(2) Transverse extent—30 inches (76 centimeters).

(3) Vertical extent—from the baseline upward without limit.

(b) Bottom damage must be assumed to be 15 inches (38 centimeters) from the baseline upward.

#### § 172.110 Survival conditions.

(a) Paragraphs (c) and (d) of this section apply to a hopper barge and paragraphs (e) through (i) apply to all other tank barges.

(b) A barge is presumed to survive assumed damage if it meets the following conditions in the final stage of flooding:

(c) A hopper barge must not heel or trim beyond the angle at which—

(1) The deck edge is first submerged; or

(2) If the barge has a coaming that is at least 36 inches (91.5 centimeters) in height, the intersection of the deck and the coaming is first submerged, except as provided in paragraph (d) of this section.

(d) A hopper barge must not heel beyond the angle at which the deck edge is first submerged by more than “fa” as defined in § 172.090(c).

(e) Except as provided in paragraphs (h) and (i) of this section, each tank barge must not heel beyond the angle at which—

(1) The deck edge is first submerged; or

(2) If the barge has one or more watertight trunks, the deck edge is first submerged by more than “fa” as defined in § 172.090(c).

(f) Except as provided in paragraphs (h) and (i) of this section, a tank barge must not trim beyond the angle at which—

(1) The deck edge is first submerged; or

(2) If the barge has one or more watertight trunks, the intersection of the deck and the trunk is first submerged.

(g) If a tank barge experiences simultaneous heel and trim, the trim requirements in paragraph (f) of this section apply only at the centerline.

(h) Except as provided in paragraph (i) of this section, in no case may any part of the actual cargo tank top be underwater in the final condition of equilibrium.

(i) If a barge has a “step-down” in hull depth on either or both ends and all cargo tank openings are located on the higher deck level, the deck edge and tank top in the stepped-down area may be submerged.

### Subpart F—Special Rules Pertaining to a Ship That Carries a Hazardous Liquid Regulated Under Subchapter O of This Chapter

#### § 172.125 Specific applicability.

This subpart applies to each tankship that carries a cargo listed in Table I of part 153 of this chapter, except that it does not apply to a tankship whose cargo tanks are clean and gas free.

#### § 172.127 Definitions.

*Length* or *L* means load line length (LLL).

#### § 172.130 Calculations.

(a) Except as provided in § 153.7 of this chapter, each tankship must be shown by design calculations to meet the survival conditions in § 172.150 in each condition of loading and operation assuming the damage specified in § 172.133 for the hull type prescribed in part 153 of this chapter.

(b) If a cargo listed in Table I of part 153 of this chapter is to be carried, the vessel must be at least the hull type

## § 172.133

specified in part 153 of this chapter for that cargo.

[CGD 79-023, 48 FR 51040, Nov. 4, 1983, as amended by CGD 81-101, 52 FR 7799, Mar. 12, 1987]

### § 172.133 Character of damage.

(a) If a type I hull is required, design calculations must show that the vessel can survive damage at any location.

(b) Except as provided in §153.7 of this chapter, if a type II hull is required, design calculations must show that a vessel—

(1) Longer than 492 feet (150 meters) in length can survive damage at any location; and

(2) Except as specified in paragraph (d) of this section, 492 feet (150 meters) or less in length can survive damage at any location.

(c) If a Type III hull is required, design calculations must show that a vessel—

(1) Except as specified in paragraph (d) of this section, 410 feet (125 meters) in length or longer can survive damage at any location; and

(2) Less than 410 feet (125 meters) in length can survive damage at any location except to an aft machinery space.

(d) A vessel described in paragraph (b)(2) or (c)(1) of this section need not be designed to survive damage to a main transverse watertight bulkhead bounding an aft machinery space. Except as provided in §153.7 of this chapter, the machinery space must be calculated as a single floodable compartment.

[CGD 79-023, 48 FR 51040, Nov. 4, 1983, as amended by CGD 81-101, 52 FR 7799, Mar. 12, 1987]

### § 172.135 Extent of damage.

For the purpose of §172.133—

(a) Design calculations must include both side and bottom damage, applied separately; and

(b) Damage must consist of the penetrations having the dimensions given in Table 172.135 except that, if the most disabling penetrations would be less than the penetrations given in Table 172.135, the smaller penetration must be assumed.

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TABLE 172.135—EXTENT OF DAMAGE

COLLUSION PENETRATION	
Longitudinal extent .....	0.495L <sup>2</sup> / <sub>3</sub> or 47.6 feet (( <sup>1</sup> / <sub>3</sub> )L <sup>2</sup> / <sub>3</sub> or 14.5m) whichever is shorter.
Transverse extent <sup>1</sup> .....	B/5 or 37.74 feet (11.5m) <sup>2</sup> whichever is shorter.
Vertical extent .....	From the baseline upward without limit.
GROUNDING PENETRATION AT THE FORWARD END BUT EXCLUDING ANY DAMAGE AFT OF A POINT 0.3L AFT OF THE FORWARD PERPENDICULAR	
Longitudinal extent .....	L/10.
Transverse extent .....	B/6 or 32.81 feet (10m) whichever is shorter.
Vertical extent from the baseline upward.	B/15 or 19.7 feet (6m) whichever is shorter.
GROUNDING PENETRATION AT ANY OTHER LONGITUDINAL POSITION	
Longitudinal extent .....	L/10 or 16.41 feet (5m) whichever is shorter.
Transverse extent .....	16.41 feet (5m).
Vertical extent from the baseline upward.	B/15 or 19.7 feet (6m) whichever is shorter.

<sup>1</sup> Damage applied inboard from the vessel's side at right angles to the centerline at the level of the summer load line assigned under Subchapter E of this chapter.

<sup>2</sup> B is measured amidships.

### § 172.140 Permeability of spaces.

(a) When doing the calculations required in §172.130, the permeability of a floodable space other than a machinery space must be as listed in Table 172.060(b).

(b) Calculations in which a machinery space is treated as a floodable space must be based on an assumed machinery space permeability of 0.85, unless the use of an assumed permeability of less than 0.85 is justified in detail.

(c) If a cargo tank would be penetrated under the assumed damage, the cargo tank must be assumed to lose all cargo and refill with salt water up to the level of the tankship's final equilibrium waterline.

### § 172.150 Survival conditions.

A tankship is presumed to survive assumed damage if it meets the following conditions in the final stage of flooding:

(a) *Final waterline.* The final waterline, in the final condition of sinkage, heel, and trim, must be below the lower edge of openings such as air pipes and openings closed by weathertight doors or hatch covers. The following types of openings may be submerged when the tankship is at the final waterline:

(1) Openings covered by watertight manhole covers or watertight flush scuttles.